18.D3 To solve this problem, we want to consult Figures 7.16(b) and 18.9 in order to determine the Ni concentration ranges over which the yield strength is greater than 130 MPa (19,000 psi) and the conductivity exceeds $4.0 \times 10^6\ (\Omega\text{-m})^{-1}$.

From Figure 7.16(b), a Ni concentration greater than about 23 wt% is necessary for a yield strength in excess of 130 MPa. In Figure 18.9 is plotted the resistivity versus the Ni content. Since conductivity is the reciprocal of resistivity, the resistivity must be less than 25×10^{-8} Ω-m--i.e., $\frac{1}{4.0 \times 10^6\ (\Omega - \text{m})^{-1}}$. According to the figure, this will be the case for Ni concentrations less than 17 wt%.

Hence, it is *not* possible to prepare an alloy meeting the criteria; for the stipulated yield strength the required Ni content must be greater than 23 wt%, whereas for the required conductivity, less than 17 wt% Ni is necessary.